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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,207	01/29/2004	Walter Schwarzenbach	4717-11600	3337
28765	7590	08/11/2006	EXAMINER	
WINSTON & STRAWN LLP 1700 K STREET, N.W. WASHINGTON, DC 20006			DUONG, KHANH B	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 08/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/766,207	<b>Applicant(s)</b> SCHWARZENBACH ET AL.	
	<b>Examiner</b> Khanh B. Duong	<b>Art Unit</b> 2822	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 May 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3,4 and 7-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,4 and 7-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

This office action is in response to the amendment filed December 13, 2005.

Accordingly, claims 1, 9, 18 and 19 were amended.

Currently, claims 1, 3, 4 and 7-19 are pending.

### ***Response to Arguments***

Applicant's arguments, see REMARKS, filed May 23, 2006, with respect to the rejection(s) of the claim(s) under Yoo have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Henley et al. (U.S. Patent No. 6,162,705).

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

**Claim 19 is rejected under 35 U.S.C. 102(e) as being anticipated by Ohmi et al. (U.S. Patent No. 6,597,039).**

Ohmi et al. ("Ohmi"), previously cited, discloses in 6A-6C a method of detaching a layer 37 from a wafer 1, which comprises: creating an weakened zone ("separation area") 3 in a wafer 1 to define the layer 37 to be detached and a remainder portion 38 of the wafer 1, such that the weakened zone 3 includes a main region 31 and a localized super-weakened region 32 that is

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more weakened than the main region 31; and initiating detachment of the layer 37 from the remainder portion 38 at the super-weakened region 32 by applying a controlled detachment force (heating or external force) to at least the weakened zone 3 such that the detachment initiates and propagates from the super-weakened region 32 through the main region 31 to detach the layer 37 from the remainder portion 38 [see col. 10, lines 18-38].

However, the recitation that “detachment is conducted under conditions sufficient to obtain a detached layer that is substantially homogenous and has a low surface roughness and improved homogeneity” (emphasis added) is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. In any event, since Ohmi discloses detachment annealing on a wafer having a weakened zone (“separation area”) 3 and a super-weakened region 32 (the same conditions as claimed), it should be inherent that a detached layer is obtained that is “substantially” homogenous and has a “low” surface roughness and “improved” homogeneity compared to the surface roughness and homogeneity obtained from a conventional detachment annealing on a wafer having a weakened zone but not a super-weakened region.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 1, 3, 4, 7-9, 11, 12 and 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi in view of Henley et al. (US 6,162,705).**

Ohmi discloses in 6A-6C a method of detaching a layer 37 from a wafer 1, which comprises: creating an weakened zone ("separation area") 3 in a wafer 1 to define the layer 37 to be detached and a remainder portion 38 of the wafer 1, such that the weakened zone 3 includes a main region 31 and a localized super-weakened region 32 that is more weakened than the main region 31; and initiating detachment of the layer 37 from the remainder portion 38 at the super-weakened region 32 by applying a controlled detachment force (heating or external force) to at least the weakened zone 3 such that the detachment initiates and propagates from the super-weakened region 32 through the main region 31 to detach the layer 37 from the remainder portion 38 [see col. 10, lines 18-38].

Re claim 1, Ohmi discloses applying a thermal treatment (heating) at least to the weakened zone 3 of the wafer 1 to initiate detachment of layer 37 from the remainder portion 38 [see col. 10, lines 21-26]. However, Ohmi does not specifically mention the thermal treatment as being controlled for evening the heating applied to the weakened zone 3.

Henley et al. ("Henley") expressly teaches in Figs. 6-8 and 14 the use of a "controlled cleaved process" that includes energy sources (e.g. thermal, etc.) to initiate detachment of a layer 2101 from a remainder portion 2100, wherein the energy sources (e.g. pulses 1 to 3) are independently controlled to provide controlled cleaving at a selected depth  $z_0$  (or weakened zone 2111) in the substrate [see col. 7, lines 9-64 and col. 13, line 9 to col. 14, line 24].

Since Ohmi and Henley are from the same field of endeavor, the purpose disclosed by Henley would have been recognized in the pertinent prior art of Ohmi.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to incorporate the controlled-cleaving process of Henley into the delamination process of Ohmi, since Henley states at column 10, lines 10-18 that such modification would provide a thin film of silicon material having limited surface roughness and desired planarity characteristics for use in a silicon-on-insulator substrate as compared to those of pre-existing techniques.

Re claim 3, Ohmi expressly discloses in FIG. 6A the detachment force 111 is applied to both the super-weakened region 32 and the main region 31.

Re claim 4, Ohmi expressly discloses in FIG. 6A the detachment force is obtained by applying energy to the weakened zone 3.

Re claim 7, see discussion above regarding claim 1.

Re claim 8, Ohmi discloses the heating of the weakened zone comprises thermally annealing the wafer [see col. 10, lines 21-23].

Re claim 9, see discussion above regarding claim 1.

Re claim 11, Ohmi discloses in FIG. 1C the weakened zone 3 is created by implanting a dose of atomic species in the wafer [see col. 10, lines 4-11].

Re claim 12, Ohmi discloses the super-weakened region 32 is created by implanting an overdose of the atomic species compared to the dose of atomic species implanted in the main region 31 [see col. 10, lines 13-17].

Re claim 14, Ohmi discloses an initial dose of atomic species is applied to the weakened zone, and the overdose is applied to the super-weakened region after the application of the initial dose [see col. 10, lines 4-11].

Re claim 15, Ohmi discloses the weakened zone 3 is created by producing a porous layer in the wafer 1 [see col. 6, lines 24-35].

Re claim 16, Ohmi expressly discloses in FIGs. 1A-1C the weakened zone 3 extends through a crystalline layer of the wafer 1.

Re claim 17, Ohmi discloses the wafer 1 comprises a semiconductor material [see col. 6, lines 37-39].

Re claim 18, as previously discussed above, the combined teaching of Ohmi and Yoo discloses providing a uniform temperature distribution to heat the weakened zone, it is inherent that the detached layer is substantially homogenous and comprises a “low” surface roughness and “improved” homogeneity.

Re claim 19, see discussions above regarding claims 1 and 18.

**Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi and Henley as applied to claims 1, 3, 4, 7-9, 11, 12 and 14-19 above, and further in view of Aspar et al. (U.S. 2003/0234075 A1).**

Re claim 13, Ohmi and Henley fail to disclose the atomic species is applied in substantially a single operation to both the super-weakened and main regions.

Aspar et al. ("Aspar"), previously cited, suggests in FIG. 1C the atomic species is applied in substantially a single operation to both the super-weakened region 36 and main region 12. [see page 3, paragraph [0054]].

Since Ohmi, Henley and Aspar are from the same field of endeavor, the purpose disclosed by Aspar would have been recognized in the pertinent prior art of Ohmi and Henley.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combined method disclosed by Ohmi and Henley as suggested by Aspar because of the desirability to minimize process steps.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

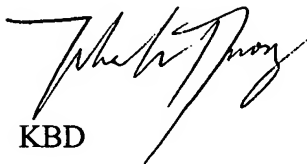
Moriceau '286 and Schwarzenbach '216 teach disclose relevant information regarding methods of detaching layers of semiconductor material.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh B. Duong whose telephone number is (571) 272-1836. The examiner can normally be reached on 10:00-6:30.



If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on (571) 272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



KBD



Michael Trim  
Primary Examiner